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SCIENCE NEWS-LETTER

The Weekly Summary of Current Science

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MUSIC IN THE AIR

Melody from Radio Squeals

(See page 202)

Vol. XVI No. 443

Beryllium for Aircraft

Beryllium, a light metal now worth $200 a pound, is likely to find commercial utilization in future aircraft construction, Dr. W. H. Gillett, director of the Battelle Memorial Institute, Columbus, Ohio, predicted in a report to the American Electrochemical Society.

Although now in the rare metal class, beryllium, on account of its light weight, a third that of aluminum, would allow decreases in the weight of aircraft. Designers have estimated that it is worth $40 to reduce the weight of an airplane one pound.

Rare as the metal is today, Dr. Gillett declared it could be obtained in quantity and at a price of about $25 to $50 a pound if there was demand for it. Geologists estimate that there is as much beryllium by weight in the earth's crust as there is lead or zinc, and much more by volume.

Due to its present high cost, little is known about beryllium's ease of fabrication and endurance. It is known to have a higher modulus of elasticity than other light metals and this property, nearly equal that of steel, promises to allow aircraft designers to use methods of construction not now possible.

Dr. Gillett declared that aircraft producers interested in a new material would do well to make a thorough investigation of this metal about which little is now known.

Science News-Letter, October 5, 1929

Light for Artists

Synthetic daylight electrically made was urged as a substitute for the traditional north skylight favored by artists for color matching when A. H. Taylor, physicist of the National Lamp Works at Cleveland, presented to the Illuminating Engineering Society observations that show that daylight from the northern sky, far from being standard, actually varies in intensity and spectral character from hour to hour and from day to day.

White light, corresponding to noon sunlight on a clear day in summer, was suggested by Mr. Taylor as the proper standard.

Science News-Letter, October 5, 1929

New Tests for Fever Carriers

A simple new test for detecting carriers of scarlet fever was described by Dr. Ruth Tunnicliff of Chicago before the American Public Health Association at Minneapolis. The test was devised to identify the organism of scarlet fever, and is well adapted for use in detecting carriers. By this test the organism can be identified in from 24 to 48 hours after the culture is made.

Results of a study of Drs. William D. Frost and Myrtle Shaw with R. C. Thomas and Mildred Gumm, from the University of Wisconsin, of the organism that causes septic sore throat were also presented to the Laboratory section. Severe epidemics of the diseases have been caused by infected milk. The organism may get into milk by outside contamination or it may come directly from infected cows that have a condition known as mastitis. In the latter case, these scientists found that the cows do not always show any symptoms of mastitis. This may be an important factor in the start of the disease even in communities where there is milk inspection. For four years the scientists have been making routine examinations of milk from all cows and of throats of all employees on farms supplying the Chicago district with certified milk.

"We have studied 17 cows, 8 from the certified herds and 9 from other herds, that were shedding *Streptococcus epidemicus* in their milk. About half of them showed no signs of clinical mastitis, and there was such a slight abnormality in the cows and their milk, that it was quite evident they would not have been excluded from the herd for a considerable time by a clinical examination."

Science News-Letter, October 5, 1929

Music in the Air

A few years ago a scientific curiosity, now a musical instrument ready to take its place in homes and orchestras, such is the history of the invention of Prof. Théremin, a young Russian scientist, for literally extracting music from the air. The picture on our cover shows this new instrument in its latest form, as demonstrated at the recent New York Radio Show, preparatory to being placed on the market.

The air from which the music is drawn is the space between the hands of the musician and the antennae of the instrument. Everyone who fooled with radio in the early days of 1922 remembers the squeals that so often used to emanate from the loud speaker, or head phones. With many of the old regenerative sets, the squeal would start if the hand was brought near, in order to turn the dials. This, of course, was the result of the changing capacity between the parts of the set and the hands of the operator.

These squeals, that have long since been banished from radio, have been tamed by Prof. Théremin, and made to produce sweet melody. At no time does the performer touch the instrument, but merely waves his hands back and forth. Bringing his right hand towards or away from the vertical rod regulates the pitch, while the distance of his left hand from the loop on the side controls the volume. In this way a musical sound of any pitch or volume may be obtained.

One advantage of the instrument over those of the present day is that jazz cannot be played on it. Only a legato can be obtained, as one note runs into the next.

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The World is Their Classroom

By Frank Thone

"A student on one end of a log and a good teacher on the other."

The man who first made this classic condensation of the essentials of a university education never expected to see the notion literally carried out.

Yet it is being done. In a score of places, scattered over the whole earth, students really are sitting on the ends of logs, getting their instructions from teachers sitting on the other ends.

And what teachers they are listening to! Some of them are breech-clouted savages of the tropical jungle with brass rings in their noses. Some of them are blanketed Indians, far up in the sub-arctic forests of Canada. Some are swarthy peasants in the hills of Sicily. Some have been dead a hundred thousand years, and have left to the students memoranda of their problems, chipped on stone or scratched on bone, as a modern professor leaves the day's lesson written on the blackboard when he has to cut his class.

RICHARD MARTIN uncovers a real prize—a Hittite burial dating back to about 700 B. C.

The students are members of the advanced courses in anthropology at the University of Chicago, and they have been scattered to the ends of the earth, to learn their lessons from the inhabitants thereof, because their professors, Dr. Fay-Cooper Cole and Dr. Edward Sapir, take seriously the dictum of Louis Agassiz: "Study nature, not books." A student who wants to make anthropology his life work receives enough training of the conventional classroom kind to lay the foundation, and then he is sent off, perhaps halfway round the world, to sit on the end of a log and learn about human beings from human beings. Prof. Cole's laboratory is the biggest laboratory in the world, for all the lands of the earth itself are its floor and the sky is its ceiling. There are no walls.

It must not be thought, however, that this business of traveling ten thousand miles or so for a course of instruction *al fresco* is just a big, adventurous picnic. There are ticks in the jungle, and mosquitoes on the tundras; bathtubs are rare in Sicily, and well-stocked cafeterias are even rarer in the heart of Australia. One sleeps how one can, and eats what comes to the table. And if mail doesn't come from home oftener than once in three or four months that has to be accepted as part of the game. Tuition for end-of-the-log instruction comes a bit high, sometimes. Nevertheless, Prof. Cole's students take it all cheerfully, girls as well as men.

For there are young women who have undertaken this arduous but fascinating first-hand study of human beings of other lands. One of the most interesting of these field problems has been tackled by the decidedly attractive Miss Charlotte Gower, who has been appointed to a fellowship of the Social Science Research Council. She has gone up into the mountains of Sicily, to a remote and inaccessible village where railway trains and automobiles are known only by hearsay, and where one gets about either on muleback or on foot.

But even before she crossed the Atlantic, Miss Gower had been in Sicily, even in this village. Out in Chicago's crowded South Side, in the heart of Little Italy, lives a close-knit group of the townsmen of this place, held together by ties of blood, language, home memories—foreigners even among foreigners. Miss Gower took up quarters among these people, made friends with them, gossipped with the women, played with the *bambini*, learned their particular dialect of Sicilian—which is about as much like the King's (and Il Duce's) Italian as Swedish is like English.

Thus equipped, the young American woman has gone to Sicily, up into the high-perched nest whence this brood "took off" for its flight to America. She takes with her the language, that first key to a stranger's confidence. She takes some knowledge of their ways, a wide acquaintance of relatives in the magic New World, greetings from the migrants to the "old folks in the old country." With the entree which all these will give her, she will make the acquaintance of the villagers, live with them, learn their folkways, their codes of behavior, their superstitions, which are centuries older than their religion. On a previous trip to this same village she lodged with the local midwife, who of course was a veritable mine of peasant lore.

Upon her return to this country, Miss Gower will return to the South Side colony. There she will re-study the ways of her transplanted Sicilian friends, seeing which of their customs have survived the transplanting into American soil, and what the new environment has done by way of modifying them. Later she plans to visit one of their agricultural settlements in the south, and then see another group which has taken up mining in America.

Not dissimilar is the task which Miss Dena Shapiro has set for herself; only in- (*Turn to next page*)

The World is Their Classroom—*Continued*

stead of studying her immigrants here in America she has to go abroad to find them. One of the most seething of all the post-war melting-pots has been Palestine, into which Jews, from all their hundred countries of exile, have been poured by the Zionist movement. It is not merely that adjustments have to be made between the newcomers and the long-established Mussulman, Christian and native Jewish populations; the newcomers themselves are a highly mixed group. The mental outlook, the customs, even the speech, of a Jewish immigrant from Ukrainia are different from those of a German Jew, and vastly different from those of a Spanish or Algerian son of Abraham. The effervescences—and even occasional explosions—that accompany their mixing-reactions offer one of the livest and liveliest studies in race migrations and race adjustments to be found anywhere in the modern world, and it is to take advantage of this that Miss Shapiro has gone to Palestine.

From the devoted and zealously intellectual Zionists, toiling under the Asian sun, to the simple but woodwise Indians of northern Canada is a far cry. And as great a contrast can be found between Miss Shapiro, a typically American co-ed of the good-looking but brainy variety, and Dr. F. K. Li, the scholarly son of Confucius who has betaken himself into the most lost lands of the world, blandly leaving word to expect him back when the snows drive him southward again. Dr. Li has held a Harvard fellowship and is now a Rockefeller fellow; at Chicago they say that he is one of the most brilliant linguists in the history of the department.

He has already scored a success in the study of Indian languages. In California he got alongside of two Indians who were the only survivors of an extinct tribe, and took down a record of their speech before it was too late. One of the Indians had not spoken his mother tongue for over thirty years. Last year Dr. Li visited the Indians of the McKenzie valley, to study the Chipewyan language, and this summer he is spending among the almost unknown Hare tribe of the Great Slave Lake region. When he has completed his Indian language studies he will return to China to carry on further researches on the history and structure of his own native speech.

In his present venture into the land of the Hares, Dr. Li has had an American forerunner. Almost two years ago another Chicago student, Cornelius B. Osgood, bade farewell to civilization and went out to this last edge of the Indian hunting grounds. The Hares are a tribe as shy and suspicious of strangers as their name indicates. Mr. Osgood has made friends with them and has been accepted as their companion, living their meager life and trying, as best a white man may, to think their primitive thoughts. It has been an epic of hardship, short rations, cold and dirt; but when Mr. Osgood comes out this fall, on the last steamboat that plies the river before it freezes solid, he will have in his pack a wealth of brand-new information about these hitherto unknown Indians.

Another and remoter British dominion, Australia, will be the field in which Gerhardt Laves expects to work. He has left for the southern continent, where he expects to gather material for his doctor's dissertation among the black aborigines. The common statement about the "black fellows" of the Australian interior is that they are the most primitive people now existing. This is correct in a sense, for their cultural level is very low; but the idea that they therefore represent a correspondingly low level in human evolution is misleading, according to Prof. Cole. It is more probable that their ancestors were once more advanced, but retrogressed when they migrated into a land where meals are lacking and food often hard to get. The Australians therefore represent a people literally starved into a lower level of sevagery.

But it is in their language that Mr. Laves is especially interested. This will make his task a little easier, for he will not have to seek isolated roving bands who have had no contact with white men. He can go to the ranch villages and mission stations, where the "black fellows" congregate as friendly Indians used to around our western trading posts, make friends with them and get their vocabulary into his notebook. Since very little study has been devoted to the language of the Australian natives, practically everything he catches will be "new specimens."

Mr. Laves' one-man expedition will mark the cooperation of two widely separated sister universities, for he will be representing the University of Sydney as well as the University of Chicago.

A really primitive people, the Siang-Dyaks of Borneo, will be the objective of John H. Provinse, who has gone into the interior of that great, mysterious tropical island with the All-American Lyric Expedition. Mr. Provinse expects to spend a year with this almost unknown people, whose only contact with the scientific world so far has been a scouting expedition into their territory by Prof. Cole himself, when he was in Malaysia some years ago.

Wider wanderings in the South Sea will be required in the researches of Gilbert McAllister. He will be working under the direction of the Bishop Museum of Honolulu, and his task will be a general ethnological survey of the island peoples. To the chance tourist all natives look alike, but as a matter of fact these brown brothers of Moana represent one of the most complicated and baffling racial tangles to be found anywhere in the world. The sea was a highway for their migrations, and each island or archipelago a small but intensely active melting-pot. Furthermore, the oral traditions of most of the island tribes are fragmentary, though some of the pieces are fairly definite. All in all an attempt to construct a genealogical tree for those tribes is a promisingly tough job, and will probably keep Mr. McAllister busy as long as he chooses to remain at it.

The challenge of the dim dawn of time, no less than the lure of far horizons, proves attractive to the Chicago students. For archaeology serves the ends of anthropology, if the broken images and weapons and potsherds turned up by the inquisitive spade are intelligently read. Out in the same vast Pacific area that has called several of his colleagues, Wendell Bennett is working under the auspices of the Bishop Museum, searching for prehistoric records of the Kanakas, original inhabitants of the Hawaiian islands, and correlating what he finds with native life as it exists today—or did just yesterday. For the Kanakas are said to be a dwindling people; certainly their life has been radically changed by contact with the white, (*Turn to next page*)

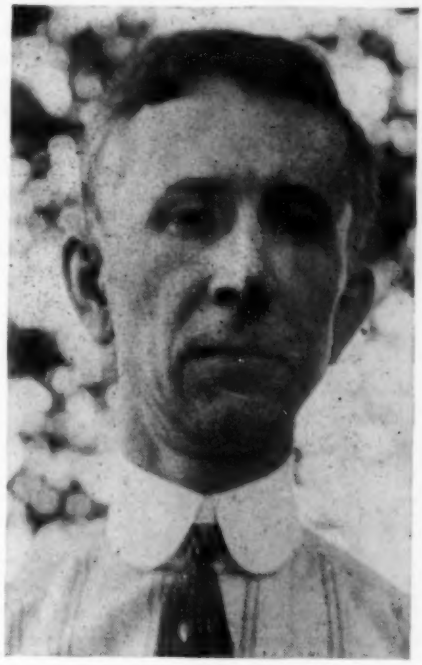
The World is Their Classroom—*Continued*

yellow and brown newcomers who have poured into their islands, and if anything is to be salvaged of their story prompt work is necessary. They were not monument-builders, the Kanakas; so for his documents Mr. Bennett must seek out ancient village sites and burial grounds, sifting every scoopful of earth for weapon or ornament or implement, and plotting the position of everything he finds—for the arrangement of things, quite as often as the things themselves, yields readable information to the searching scientist.

When we were kids in Sunday school, mention of the Hittites used to crop up occasionally in Old Testament history. These people with the extremely combative name (they deserved it) supplied warlike diversion to other peoples besides the Hebrews; indeed, the small Kingdom of Israel was among the least of their troubles. They had a powerful empire centering in Asia Minor, and their armies clashed with the mighty hosts of the pharaohs long before Tut Ankh Amen was born. As a matter of fact, when King Tut died his young widow tried to make a match with a Hittite prince, in order to hold her power.

But most of what we know about Hittite history has been told us by their neighbors—Hebrews, Egyptians, Babylonians. They left few monuments, fewer inscriptions, and no parchments or papyri at all. They were not a scholarly folk. Digging for facts in Hittite territory, therefore, is not the easiest job in the world; but like many hard tasks it brings a good reward when it brings any at all. So another student, Richard Martin, has gone a-hunting Hittites, under the auspices of the Oriental Institute of the University of Chicago.

One unique and highly valuable find in the Hittite campaign has been a group of burials, dug up to the east of Palestine. These are the only skeletons of Hittites that have ever been found in good enough condition to be studied, and measurements of the skulls are beginning to answer some of the puzzling questions about the race and origin of this important people of antiquity. The skulls are of medium size, and of a shape which Prof. Cole characterizes as "proto-Mediterranean"; that is, of the same general character as the ancient Italians and Greeks, but more primitive,



PROF. FAY-COOPER COLE, whose office is at the University of Chicago but whose classroom is the world

and suggestive in some ways of the ancient Egyptians.

Unlike the Hittites, Indians aren't mentioned in the Bible; nevertheless the American red men bulk large in our childhood memories, fed on the tales of pioneering grandparents. It is only natural therefore that Indian archaeology should claim its share of the Chicago group's attention. For one thing, the Indian mounds that dot the Illinois prairies furnish beautiful material for shorter expeditions, and give 'prentice anthropologists a chance to show how much in earnest they are about a profession that is, after all, about nine-tenths pick-and-shovel work. Prof. Cole has undertaken a comprehensive survey of all the mounds remaining in Illinois, and is saving as many of them as he can from the ruinous activities of relic-hunting amateurs.

A little farther afield, there are students digging in the ruins of the higher Indian civilization of our Southwest. These are Paul Martin and Paul Nesbitt. Mr. Martin is already the veteran of two expeditions to the famous ruins of Chichen Itza in Yucatan, under the Carnegie Institution of Washington. At Chichen, he uncovered and reassembled the stones of a small but beautiful Maya temple. Just now he is investigating the ruins of an exceedingly ancient type of Pueblo structure, which appears to be the forerunner of those great piles of masonry built by the Southwestern Indians, and appropriately called the first apartment houses in America.

Mr. Nesbitt also is the veteran of a campaign far afield. He was associated with Alonzo Pond of the Beloit Museum in the discovery in northern Africa of relics of an Old Stone Age race of human beings that have set one of the most puzzling problems on which anthropologists are now racking their wits. The implements found in the site resemble those used by the famous Cro-Magnon race, but the five skulls—one of a child, the others of adults—are distinctly "modern" in type, with nothing Cro-Magnon about them. These ancient-modern people would would be instantly hailed by comic section editors as ancestors of the French, for they apparently lived almost entirely on snails. Most of the relics of their culture, as well as the burials that have been brought to light, were dug up out of vast heaps of snail-shells.

Mr. Pond, although as yet scarcely turned thirty, is one of the old campaigners of the Chicago group. His first expedition, under the Logan Museum of Beloit College, resulted in the Stone Age finds in the snail-shell heaps. After that, he went hunting relics of still older man in inner Asia, with the Roy Chapman Andrews expedition of the American Museum of Natural History. Then back to northern Africa, where he is laboring at present. He plans next to go to South Africa, where recent finds, of alleged sensational significance in the story of man's evolution, have been exciting the interest of anthropologists and paleontologists.

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Hog Big as Auto

The fossil skeleton of a giant hog which stood seven feet tall has just been mounted in Morrell Hall at the University of Nebraska. The terrible pig in his prehistoric day was as high as the tallest modern automobile and had a wheel base of about 140 inches.

The fossil was dug up in Sioux County, Nebraska. Only two of the giants have ever been discovered.

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New York Telephones Australia

America talked with Australia through regular telephone instruments for the first time last week, when officials of the American Telephone and Telegraph Company exchanged greetings with the Australian telephone officials in Sydney. The occasion was an informal demonstration of the practicability of connecting the transatlantic telephone channel operated by the American Telephone and Telegraph Company and British Post Office with the new short wave radio telephone channel operated by the British General Post Office between Great Britain and the Australian continent, that may soon be open for commercial use. The directive short-wave transatlantic radio channel that is now in regular use for European service was used in the demonstration instead of the long-wave channel so that the voices of the speakers were carried a total distance of 15,000 miles by the short-wave system of transmission interconnecting the wire systems of the United States and Australia.

From the office of President Walter S. Gifford of the American Telephone and Telegraph Company calls passed over wire lines to the company's short-wave transmitting center at Lawrenceville, N. J.; thence by radio to the short-wave receiving station of the British General Post Office at Baldock near London, England; and thence by wire via London to the British Government's transmitting station at Rugby, England, and again by radio to the receiving station of Amalgamated Wireless of Australia, near Sydney. The return path was again to Baldock; thence via Rugby to the Bell System's short wave receiving station at Netcong, N. J.

An interesting aspect of the conversations was that, taking place at 4 o'clock, September 25, New York time, the clocks in Sydney read 6 A. M., September 26.

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Twin Carbon

Carbon is the latest chemical element to be shown to have a twin. Last winter two California physicists showed that oxygen, long supposed to be single, was not only double, but triple. Now Dr. Arthur S. King of the Mt. Wilson Observatory, and Dr. Raymond T. Birge of the University of California, have found a kind of carbon that is heavier than the ordinary form. Carbon is one of the most essential elements in living matter.

These experimenters heated carbon in a vacuum in an electric furnace to a temperature around 5,000 degrees Fahrenheit. When the light that it emitted was analyzed with a spectroscope, the usual bright bands of the spectrum appeared, including a very prominent green one. Close to this, however, the photographs showed another, very faint, and previously unknown.

Ordinary carbon is of mass 12, in the scale used for measuring the mass of the atoms. Dr. King and Dr. Birge announce that the new band can be explained by the presence along with ordinary carbon of another kind, or isotope, of mass 13. They are unable to estimate the relative proportions of the two kinds, but the heavier isotope must be present in very small quantities, for the band is hundreds of times fainter than the strong one.

Isotopes, or forms of the same element having different weight atoms, were first discovered in connection with studies of radium and similar elements. A few years ago Dr. F. W. Aston, an English scientist, proved that a number of common elements consisted of as many as six or more isotopes. Last year Dr. W. F. Giauque and H. L. Johnstone, of the University of California, showed the existence of three oxygen isotopes, weighing 17 and 18, as well as the ordinary kind, weighing 16.

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Rustproof Steel Welds

Rustproof steel is easily welded by the acetylene-oxygen process and is even more rustproof after welding than before due to loss of carbon, silicon and manganese during melting. These findings by W. Hoffmann, German metallurgist, have just been announced by the National Advisory Committee for Aeronautics. The physical characteristics of rustproof-steel welds are better than those of soft-steel welds, but the hardness of the metal due to welding must be removed by heat treatment. The rustproof steels most used contain large percentages of chromium or chromium and nickel.

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Shining Fly Paper

Luminous fly paper that lures light-loving flies to a sticky doom may soon be in use, Lyman Chalkley, Jr., director of research of Pedlar and Ryan, New York, told the Illuminating Engineering Society. Phosphorescent pigments mixed with the sticky coating produces a light when the fly paper is in the dark.

"Photoluminescence is finding an increasing number of industrial applications," Mr. Chalkley explained. "Phosphorescent materials, that emit light for some time after the exciting light has ceased, are used on lifebuoys, signboards and house numbers."

Fluorescent materials which glow only while under the influence of an activating light are also finding use. When illuminated by ultraviolet light, itself invisible to the eyes, they produce visible light used effectively on the stage and in window displays. By combining phosphorescent and fluorescent pigments in costumes or signs, striking effects can be obtained.

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The American carrot crop has jumped from three to six million bushels within five years.

Chickens may be immunized against chicken pox by applying the virus of the disease to the leg.

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CLASSICS OF SCIENCE: Galton on Heredity

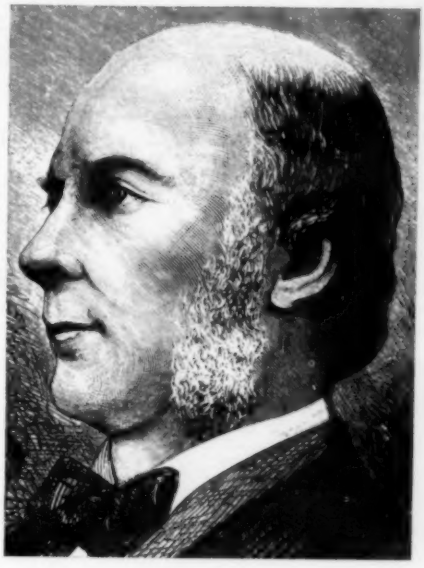
This book was written 24 years after Mendel's *Experiments in Plant Hybridization* (see SCIENCE NEWS-LETTER March 17 and 24, 1928), but nearly as long before that fundamental research became available to the scientific world at large. It is interesting to note Galton's statistical method of attack on the problem, as contrasted with Mendel's experimental one.

NATURAL INHERITANCE by Francis Galton. London, 1889.

Latent Elements

It is not possible that more than one half of the varieties and number of each of the parental elements, latent or personal, can on the average subsist in the offspring. For if every variety contributed its representative, each child would on the average contain actually or potentially twice the variety and twice the number of elements (whatever they may be) that were possessed at the same stage of its life by either of its parents, four times that of any one of its grandparents, 1024 times as many as any one of its ancestors in the 10th degree, and so on, which is absurd. Therefore, as regards any variety of the entire inheritance, whether it be dormant or personal, the chance of its dropping out must on the whole be equal to that of its being retained, and only one half of the varieties can on the average be passed on by inheritance. Now we have seen that the *personal* heritage from either Parent is one quarter, therefore as the *total* heritage is one half, it follows that the Latent Elements must follow the same law of inheritance as the Personal ones. In other words, either Parent must contribute on the average only one quarter of the Latent Elements, the remainder of them dropping out and their breed becoming absolutely extinguished.

There seems to be much confusion in current ideas about the extent to which ancestral qualities are transmitted, supposing that what occurs occasionally must occur invariably. If a maternal grandparent be found to contribute some particular quality in one case, and a paternal grandparent in another, it seems to be argued that both contribute elements in every case. This is not a fair inference, as will be seen by the following illustration. A pack of playing cards consists, as we know of 13 cards of each sort—hearts, diamonds, spades, and clubs. Let these be shuffled together and a batch of 13 cards dealt out from them, forming the deal, No. 1. There is not a single card in the entire pack that may not appear in these 13, but assuredly they do not all appear. Again, let the 13 cards derived from the above pack, which we will suppose to have green backs, be shuffled with another 13 similarly obtained from a pack with blue backs, and that a deal, No. 2, of 13 cards be made from the combined batches. The result will be of the same kind as before. Any card of either of the two original packs may be found in the deal, No. 2, but certainly not all of them. So I conceive it to be with hereditary transmission. No given pair can possibly transmit the whole of their ancestral qualities; on the other hand, there is probably no description of ancestor whose qualities have not been in some cases transmitted to a descendant.



FRANCIS GALTON

The fact that certain ancestral forms persist in breaking out, such as the zebra-looking stripes on the donkey, is no argument against this view. The reversion may fairly be ascribed to precisely the same cause that makes it almost impossible to wholly destroy the breed of certain weeds in a garden, inasmuch as they are prolific and very hardy, and wage successful battle with their vegetable competitors whenever they are not heavily outmatched in numbers.

If the Personal and Latent Elements are transmitted on the average in equal numbers, it is difficult to suppose that there can be much difference in their variety. . . .

Simplification of Inquiry

These considerations make it probable that inquiries into human heredity may be much simplified. They assure us that the possibilities of inheritance are not likely to differ much more than the varieties actually observed among the members of a large Fraternity. If then we have full life-histories of the Parents and of numerous Uncles and Aunts on both sides, we ought to have a very fair basis for hereditary inquiry. Information of this limited kind is incomparably more easy to obtain than that which I have hitherto striven for, namely, family histories during four successive generations. When the "children" in the pedigree are from 40 to 55 years of age, their own life-histories are sufficiently advanced to be useful, though they are incomplete, and it is still easy for them to compile good histories of their Parents, Uncles, and Aunts. Friends who knew them all would still be alive, and numerous documents such as near relations or personal friends preserve, but which are mostly destroyed at their decease, would still exist. If I were undertaking a fresh inquiry in order to verify and to extend my previous work, it would be on this basis. I should not care to deal with any family that did not number at least six adult children, and the same number of uncles and aunts on both the paternal and maternal sides. Whatever could be learnt about the grandparents and their brothers and sisters, would of course be acceptable, as throwing further light. I should however expect that the peculiarities distributed among any large Fraternity of Uncles and Aunts would fairly indicate the variety of the Latent Elements in the Parent. The complete heritage of the child, on the average of many cases, might then be assigned as follows: One quarter to the personal characteristics of the Father; one quarter to the personal characteristics of the Fraternity taken as a whole, of whom the Father was one of the members; and similarly as regards the Mother's side. . . .

Summary

As soon as the character of the problem of (*Turn to next page*)

Galton on Heredity—*Continued*

Filial descent had become well understood, it was seen that a general equation of the same form as that by which it was expressed, also expressed the connection between Kinsmen in every degree. The unexpected law of universal Regression became a theoretical necessity, and on appealing to fact its existence was found to be conspicuous. If the word "peculiarity" be used to signify the difference between the amount of any faculty possessed by a man, and the average of that possessed by the population at large, then the law of Regression may be described as follows: Each peculiarity in a man is shared by his kinsmen, but *on the average* in a less degree. It is reduced to a definite fraction of its amount, quite independently of what its amount might be. The fraction differs in different orders of kinship, becoming smaller as they are more remote. When the kinship is so distant that its effects are not worth taking into account, the peculiarity of the man, however remarkable it may have been, is reduced to zero in his kinsmen. This apparent paradox is fundamentally due to the greater frequency of mediocre deviations than of extreme ones, occurring between limits separated by equal widths.

Two causes affect family resemblance; the one is Heredity, the other is Circumstance. That which is transmitted is only a sample taken partly through the operation of "accidents", out of a store of otherwise unused material, and circumstance must always play a large part in the selection of the sample. Circumstance comprises all the additional accidents, and all the peculiarities of nature both before and after birth, and every influence that may conduce to make the characteristics of one brother differ from those of another. The circumstances of nurture are more varied in Co-Fraternities than in Fraternities, and the Grandparents and previous ancestry of members of Co-Fraternities differ; consequently Co-Fraternals differ among themselves more widely than Fraternals.

The average contributions of each separate ancestor to the heritage of the child were determined apparently within narrow limits, for a couple of generations at least. The results proved to be very simple; they assign an average of one quarter from each parent, and one sixteenth from each grandparent. According to this geometrical scale continued indefinitely backwards, the total heritage of the child would be accounted for, but the factor of stability of type has to be reckoned with, and this has not yet been adequately discussed. . . .

Finally, considerations were offered to show that latent elements probably follow the same law as personal ones, and that though a child may inherit qualities from any one of his ancestors (in one case from this one, and in another case from another), it does not follow that the store of hidden property so to speak, that exists in any parent, is made up of contributions from all or even very many of his ancestry.

Two other topics may be mentioned. Reason was given . . . why experimenters upon the transmission of Acquired Faculty should not be discouraged on meeting with no affirmative evidence of its existence in the first generation, because it is among the grandchildren rather than among the children that it should be looked for. Again, it is hardly to be expected that an acquired faculty, if transmissible at all, would be transmitted without dilution. It could at the best be no more than a variation liable to Regression, which would probably so much diminish its original amount on passing to the grandchildren as to render it barely recognizable. The difficulty of devising experiments on the transmission of acquired faculties is much increased by these considerations.

The other subject to be alluded to is the fundamental distinction that may exist between two couples whose personal faculties are naturally alike. If one of the couples consist of two gifted members of a poor stock, and the other of two ordinary members of a gifted stock, the difference between them will betray itself in their offspring. The children of the former will tend to regress; those of the latter will not. The value of a good stock to the well-being of future generations is therefore obvious, and it is well to recall attention to an early sign by which we may be assured that a new and gifted variety possesses the necessary stability to easily originate a new stock. It is its refusal to blend freely with other forms. Some among the members of the same fraternity might possess the characteristics in question with much completeness, and the remainder hardly or not at all. If this alternative tendency was also witnessed among cousins, there could be little doubt that the new variety was of a stable character, and therefore capable of being easily developed by interbreeding into a pure and durable race.

Francis Galton (1822-1911) was first cousin to Charles Darwin and a member of one of the striking families rich in members of unusual scientific attainments. In 1869 Galton published his first work on inheritance, *Hereditary Genius, its Laws and Consequences.* He then went on to a wider study of general characteristics, who conclusions are reprinted here. Definition of inheritable traits led him to the study of anthropometric measurements and fingerprints (see SCIENCE NEWS-LETTER, February 11, 1928).

Science News-Letter, October 5, 1929

Vegetable Milk

Synthetic "milk" made out of vegetables was the means used by Dr. Ernst Tso of Peipin to give six Chinese babies a start in life.

The great scarcity of cow's milk in Oriental countries led Dr. Tso to search for a substitute to help in the rearing of young babies in North China. A milky liquid made of finely ground soy beans and water furnished the base for the vegetable milk, Dr. Tso told scientists meeting at the Thirteenth International Physiological Congress.

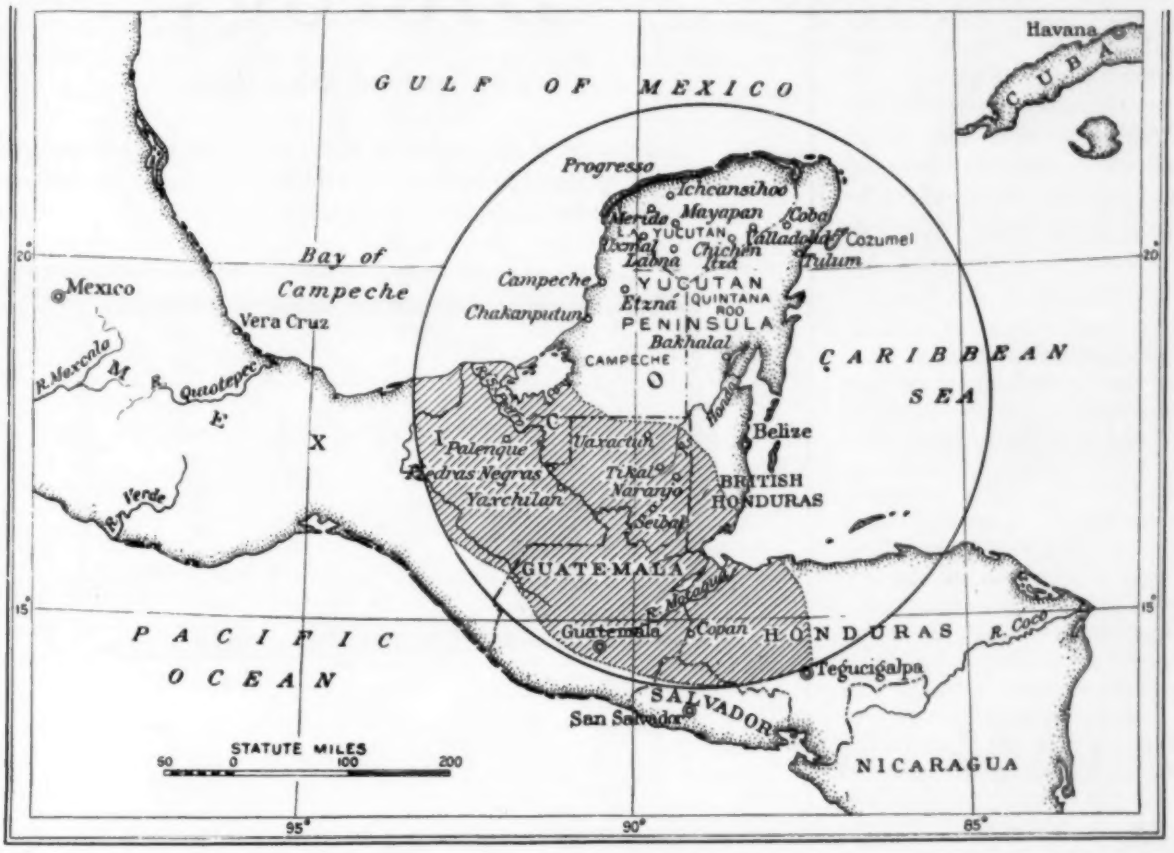
Fifty per cent. of the total calories of the diet are from this "milk," Dr. Tso stated. Additional foods given to the babies were cane sugar, corn or rice starch, cod liver oil, calcium lactate, sodium chloride and cabbage water. The last item contributed the scurvy-preventnig vitamin C, present in orange juice.

"Six infants," said Dr. Tso, "one from birth and the others a few weeks old, were successfully fed six to ten months on this diet. Their weight curves follow closely the average weight curve of healthy nursing infants in the United States as well as the average weights of several hundred Chinese breast fed infants who visited the college dispensary for minor complaints. Their mental and muscular development and nutritional status in general appear to be as good as what one sees in normal infants reared on milk diets."

Science News-Letter, October 5, 1929

So solid a vegetable as a potato contains 78 per cent. of water.

Lindbergh Flights to Discover Lost Cities



WHERE COL. LINDBERGH will fly to discover the lost Maya cities. The circle encloses the area occupied by the Mayas during the first fifteen centuries of the Christian era. The shaded portion indicates the Old Empire Region, where they lived for a thousand years. This map, which was prepared by the Carnegie Institution, shows only the principal Maya cities.

When Lindbergh and Carnegie Institution archaeologists fly over the jungles of northern Central America and Mexico in search of lost Maya cities, they will be adding a new method to the scientific exploration of ruins of one of the world's most interesting civilizations.

Buried beneath almost impenetrable tropical forests in the Yucatan peninsula, Guatemala, Honduras, and British Honduras, there are the remains of populous cities that flourished long before the time of Columbus. Many of these abandoned cities, rich with artistic temples and monuments, lie hidden, unseen by modern eyes. On foot, tediously hacking a path through the tangled growth, an explorer might pass within a few hundred yards and yet not find the ruins. From the air, a few hours' flying may reveal not one, but several, hitherto unmapped and possibly totally unknown Maya cities.

Such is the expectation of Col. Charles A. Lindbergh and Dr. Oliver Ricketson, the Carnegie Institution archaeologist, who will fly with him in a Pan-American Airways airplane. Their base at Belize, British Honduras, is nearly in the center of the region that the Maya inhabited from before the time of Christ until about the year 1500. Today the descendants of the race that showed such accomplishment live in the same area in a primitive state, unmindful of their glorious past.

Col. Lindbergh's aerial photographic experience obtained on recent flights over the southwest will prove useful on the projected flying over the Maya country. It is expected that he will act as photographer as well as pilot and that Dr. Ricketson will do the mapping that will allow land parties to reach and excavate the cities that are discovered.

The cooperation between the Pan American Airways and the Carnegie Institution of Washington links two organizations that are pioneering in the rediscovery of Central America. The projected airlines of the Pan American Airways pass near such cities as Chichen Itza, Copan and Etzna, which archaeologists of the Carnegie Institution have excavated and studied.

The airplane in Middle America can duplicate the remarkable feats achieved in England, where O. G. S. Crawford, air corps observer, has discovered Roman towns and trenches by means of air photography. These trenches and streets were long since plowed over by British farmers and were presumably lost forever to the knowledge of historians, but where the ground was once disturbed, the texture of the soil has been altered, and the crops planted there are apt to be greener and more luxuriant. The air camera or the keen eye of the airplane observer can often trace the exact plan of the vanished town or fortress. By some such method the stone highways which the Maya built to connect their important cities can probably be traced.

It is only a few years ago that the existence of these smooth stone roads, 30 to 60 feet (*Turn to next page*)

Lindbergh—*Continued*

wide, was discovered. Dr. Thomas Gann, who found sections of the roads in the forest near Coba, concluded that the Mayas could not have needed such highways for traffic, since they had no wagons or beasts of burden and since they would have found dirt roads suitable for their long journeys. The roads, he believes, must have been laboriously constructed over long distances between religious centers for use by the religious processions of priests, votaries and sacrificial victims.

One highway which airplane observers may search for is the road which Dr. Gann believes must have stretched from Coba to Cozumel Island to which the Maya made religious pilgrimages. Another may have led from Coba to Chichen Itza, famed religious city, sacred to the deity known as the Plumed Serpent.

The airplane archaeologist today has an opportunity to "discover" Middle America in pioneer fashion. The sixteenth century Spaniards who discovered Yucatan and the Aztec cities wrote excited, glittering accounts of gold and jewels and beautiful women and marble palaces. But their tales were considerably discounted by sober stay-at-homes who reflected that the Spaniards were not calm scientific observers and were merely trying to prove the importance and worth of their voyage of conquest.

Ninety years ago, an adventurous American, John L. Stephens, went into the Yucatan jungle and proceeded to discover the Indian cities again for the world at large. His verdict on the bas-reliefs and paintings which adorned the official buildings of the ruined cities was that "in justice of proportion and symmetry they have approached the Greek models."

After Stephens came a long series of archaeologists, all of whom have been kept busy discovering the Mayas and the Aztecs. There are 1,200 sites in Mexico alone which are pronounced of archaeological importance, and no one can guess how many more lie buried in inaccessible corners of the region.

The airplane offers a rapid method of discovering this much-discovered country. More than that, it offers the possibility of revealing plans and explaining mysteries which the groundling scientist could not solve.

Biology

is the study of *living things*

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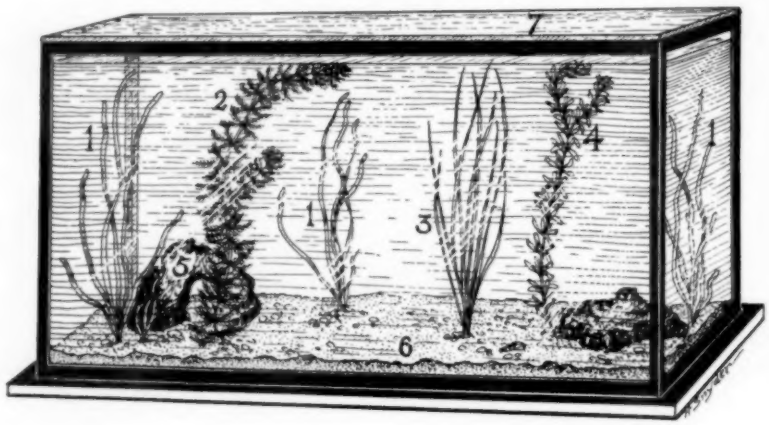

Diagram to show proper planting of a 9-gallon aquarium tank

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2. Myriophyllum
3. Vallisneria
4. Elodea
5. Rock
6. Sand or fine gravel
7. Glass on top of tank

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Chinese Society Stops Exploration

Responsibility for the interruption of the work of the American Museum of Natural History in Mongolia is laid at the door of a Chinese organization, the Society for the Preservation of Cultural Objects, by Dr. Henry Fairfield Osborn, president of the American Museum, in a communication to *Science*.

The expeditions of the Museum, of which the present was intended to be the seventh, have attracted world-wide attention because of their sensational discoveries of dinosaur eggs and fossils, and for their hope of finding the original home of the human race.

The Chinese Society for the Preservation of Cultural Objects is not in any way an official body, but it possesses great influence and has apparently been able to bend officers of the Chinese government to its will. Roy Chapman Andrews, leader of the American field party, describes much anti-foreign propaganda which this organization has been carrying on through the press and other media, charging American and European scientific expeditions with "stealing China's priceless treasures," "infringing her sovereign rights," "seeking for oil and minerals," "being spies against the government," and so on.

At the beginning of the 1929 season, Mr. Andrews states, the Chinese demanded joint participation in and control over the field expedition, the retention in China of much of the material obtained and the eventual return of all specimens sent to the United States for study, and payment by the American Museum of all expenses for Chinese experts sent to this country to carry on research in the museum. After prolonged negotiations in an endeavor to obtain a modification of these demands the American Museum authorities decided to suspend operations.

The Chinese Society for the Preservation of Cultural Objects, Mr. Andrews charges, has interfered with the transportation of specimens obtained by the expedition of a year ago, causing Chinese officials to hold them at Kalgan for six weeks, and demanding certain concessions to the Society before they were released. Dr. Osborn adds that through the active interest of the Chinese minister, Dr. Chao Chu Wu. and Secretary of State Stimson, the collection has finally been shipped and is now on the way to the American Museum, after a delay of more than a year.

American scientists have not been alone in their molestation through the influence of this Chinese society. A large Swedish expedition, under the noted explorer Sven Hedin, was forced to accept the addition of a group of Chinese to its personnel at Swedish expense, and to permit joint Chinese control.

Science News-Letter, October 5, 1929

New Anesthetic Removes Fear

A new anesthetic which puts patients to sleep so pleasantly and easily that they ask for more, has been reported by Dr. J. S. Lundy of the Mayo Clinic and Dr. R. M. Isenberger, professor of pharmacology of the University of Kansas. Fewer unpleasant after-effects and far less danger than many of the local anesthetics are claimed for this new aid to surgery, which has the impressive name of iso-amylethyl barbituric acid.

The work grew out of the old problem of how to offset the bad effects of some local anesthetics. Many investigators have sought means of avoiding the occasional cases of poisoning by cocaine. Accordingly, procaine, a synthetic product, was developed as a substitute for cocaine. Drs. Isenberger and Lundy, following along the line of some previous workers, found that certain substitution products of barbituric acid gave protection against convulsions from procaine. They reported their work with iso-amylethyl barbituric acid about a year ago.

In the course of a year's further work, Dr. Lundy has used iso-amylethyl barbituric acid, experimentally, and for the benefit of patients, over a thousand times. He has given it by mouth before administering local anesthesia and the apprehension from which some patients suffer before an operation has been lessened in this way. Moreover, convulsions, that occasionally come on from the use of procaine, have not apeared in any cases in which iso-amylethyl barbituric acid has been used.

Also, following the work of Zerfas, Lundy has used this product, by injection into a vein, to produce all or part of the general anesthesia in 273 major operations. Surgeons who have employed it in this way have found that patients wish to have it again if, for any reason, they need to have another operation. It quiets patients before operation and adds to their comfort after operation by producing a semi-conscious state for some hours after they have returned to bed. Nausea and vomiting are greatly lessened or entirely eliminated.

More work must be done on this subject before the product will, or should be used as commonly as morphine, ether and nitrous oxide now are used in general anesthesia. For some time, as with any new procedure in medicine, cases in which the substance is to be used must continue to be carefully selected to eliminate risk. However, with the interest that has been aroused by this work, by the use of carbon dioxide at the end of inhalation anesthesia as advocated by Dr. Yandell Henderson of Yale and by the report on the use of cyclopropane that was given recently by Dr. G. H. W. Lucas of Philadelphia and Dr. V. E. Henderson of Toronto at the Thirteenth International Physiological Congress, patients who must undergo operations may, in the near future, be freed from the dread that some of them have of being put to sleep.

Science News-Letter, October 5, 1929

New Finish for Aluminum

A new, simple and cheap method of giving aluminum a dead white finish is described by Leon McCulloch, research chemist of the Westinghouse Electric and Manufacturing Co. The metal is boiled in milk of lime to which a little calcium sulphate is added. The new coating will be tested as a base upon which to apply paints and enamels to aluminum.

Science News-Letter, October 5, 1929

Plans are being made to furnish airplane service to Iceland for both passengers and mail.

Reference Books

Allen—Vol. VII. (VEGETABLE ALKALOIDS) Commercial Organic Analysis

869 Pages. Cloth, $7.50. Each section has been prepared by a well known specialist on that subject.

"The volume offered is a complete treatise on the available analytic data concerning the vegetable alkaloids."—Journal of The Franklin Institute.

Parkes and Kenwood's HYGIENE AND PUBLIC HEALTH. 8th Edition

90 Illustrations. 823 Pages. Cloth, $7.00. By Louis C. Parkes; Revised by Henry R. Kenwood, M. D., University of London.

"This work will be found invaluable for all directly engaged in public health work."—Journal Michigan State Medical Society.

Halliburton and McDowall's HANDBOOK OF PHYSIOLOGY. 18th Edition.

508 Illustrations. 908 Pages. Cloth, $4.75. By W. D. Halliburton, M. D., and R. J. S. McDowall, F. R. C. P., King's College, London.

"The volume presents the science of physiology in its classic form."—American Journal of Science.

Gould's NEW MEDICAL DICTIONARY. 2nd Edition.

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"An authoritative work which should find itself on the shelves of every reference library."—Catholic Educational Review.

Piney's RECENT ADVANCES IN HAEMATOLOGY. 2nd Edition.

4 Colored Plates. 18 Text figures. 318 Pages. Cloth, $3.50. By A. Piney, M. D., Research Pathologist, Cancer Hospital, London.

"A most valuable reference book."—The Canadian Medical Association Journal.

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FIRST GLANCES AT NEW BOOKS

EDISON: HIS LIFE AND INVENTIONS—Frank Lewis Dyer, Thomas Commerford Martin and William Henry Meadowcroft—*Harper* ($10). This is the standard, authorized and official biography of Edison by men who have been most closely associated with him in his business, legal and personal affairs. Mr. Dyer was general counsel for the Edison interests from 1903 and Mr. Meadowcroft has been closely associated with Mr. Edison since 1881 and his confidential secretary since 1910. The first edition of the work came out in 1910 and the new edition includes chapters on the development of the diamond-disc phonograph and Edison's war-time activities and the post-war period in which he has been largely concerned with new sources of the rubber supply from home-grown plants and in which he has been the recipient of unprecedented honors from the American people. Among these honors his biographers do not consider it worth while to mention that Mr. Edison was made a member of the National Academy of Sciences in 1927. An appendix contains a list of the most important of the 1150 patents taken out by Edison with specifications of some of them. The work ends with the significant sentence: "He still works from 16 to 18 hours a day."

Science News-Letter, October 5, 1929

THOMAS ALVA EDISON: AN APPRECIATION—*National Electric Light Association* (45c.). A beautifully printed pamphlet containing the text of the various addresses given to honor Mr. Edison at the Association's meeting in Atlantic City last June. The authors are Preston S. Arkwright, John W. Lieb, Charles L. Edgar, Berton Braley, Elmer A. Sperry, Thomas N. McCarter and E. Wilbur Rice, Jr.

Science News-Letter, October 5, 1929

GRAND CANYON COUNTRY—M. R. Tillotson and F. J. Taylor—*Stanford Univ. Press* ($2). The Superintendent of Grand Canyon National Park and a well-known outdoorsman have collaborated in the production of an informative and enterprising account of the greatest single scenic spectacle on this continent.

Science News-Letter, October 5, 1929

LOKI: THE LIFE OF CHARLES PROTEUS STEINMETZ—Jonathan Norton Leonard—*Doubleday, Doran* ($2.75). Here is a new life of the German hunchback, whose coming to America did so much to give electricity the place that it now occupies in our daily lives. Mr. Leonard has produced a book that deserves to rank with such great biographies of technical men as Pupin's "From Immigrant to Inventor," or Watson's "Exploring Life," even though it is not autobiographical. Mr. Leonard presents a picture of Steinmetz very different from that cultivated by the press during the last years of his life. Like Loki, he was not a full-blooded god—he never quite belonged to the divine family of Asgard, but, says the author, "his mind was one of the best in the world."

Science News-Letter, October 5, 1929

VULCAN: OR THE FUTURE OF LABOUR — Cecil Chisholm — *Dutton* ($1). Labor thus finds its place in the interesting "Today and Tomorrow" series. The one day week and the disappearance of the foreman are some of the pleasures of labor foreseen by the author.

Science News-Letter, October 5, 1929

EOS: OR THE WIDER AAPECTS OF COSMOGONY—Sir James Jeans—*Dutton* ($1). In this recent volume in the ever-stimulating "Today and Tomorrow Series," Sir James tells in simple language the significance of some of his own important researches. Failing some unimaginable creative event, he believes, the ultimate end of creation will be "neither sunlight nor starlight, but only a cool glow of radiation uniformly diffused through space." All the atoms of matter will then have been transmuted to energy.

Science News-Letter, October 5, 1929

HERACLITUS: OR THE FUTURE OF FILMS—Ernest Betts—*Dutton* ($1). The author of this new addition to the "Today and Tomorrow Series" believes that the "talkies" spell the doom of the cinema. "The soul of the film—its eloquent and vital silence—is destroyed," he says. "The film now returns to the circus whence it came, among the freaks and the fat ladies."

Science News-Letter, October 5, 1929

HANBUCH DER ASTROPHYSIK; BAND IV: DAS SONNENSYSTEM—G. Abetti, W. E. Bernheimer, K. Graff, A. Kopff and S. A. Mitchell—*Julius Springer, Berlin* (RM 78.80). When finally completed, this monumental work under the editorship of three leading German astronomers (Drs. G. Eberhard, A. Kohlschütter and H. Ludendorff, will form the most comprehensive survey of astrophysics in any language. Volume VI, the second part of "Das Sternsystem", appeared somewhat over a year ago. Despite its rather high price, this new volume is already in every American astronomical library that makes a claim to completeness. To the individual scientist, or even the layman, who wishes the newest and most complete discussion of the physics of the solar system, it will also supply a want. Two of the five sections, covering 298 out of 501 pages, are in English—one by Prof. G. Abetti, of Florence, on "Solar Physics"; the other by Prof. S. A. Mitchell, of the University of Virginia, on "Eclipses of the Sun". With the exception of Prof. Mitchell's larger work on "Eclipses of the Sun" this latter section forms the best treatise on the subject in English. In German, Dr. W. E. Bernheimer, of Vienna, writes on "Radiations and Temperature of the Sun"; Dr. K. Graff, also of Vienna, on "The Physical Constitution of the Planet System" and Dr. A. Kopff, of Berlin-Dahlem, on "Comets and Meteors".

Science News-Letter, October 5, 1929

THE PLANT IN RELATION TO WATER—N. A. Maximov—*Macmillan* ($6.50). The mere announcement that this book is now available in an English translation is all the review it needs. English-speaking plant physiologists and ecologists have been waiting eagerly for it, and this version will stand as a fitting monument to the memory of its scholarly translator, the late Prof. Yapp. Even a hasty examination reconfirms the conviction that in Prof. Maximov Russia has a plant physiologist well able to uphold the honor which his compatriot Palladin earned in another division of his science. It is flattering to American students of plant life to note the extent to which plant physiological work in this country is discussed.

Science News-Letter, October 5, 1929

First Glances at New Books—*Continued*

THE EARTH: ITS ORIGIN, HISTORY AND PHYSICAL CONSTITUTION—Harold Jeffreys—*Macmillan* ($6.50). The first edition of this work appeared in 1924. In this new edition Dr. Jeffreys has expanded the section on seismology and added and expanded some other parts to take account of recent work. It still remains an excellent outline of the main problems of geophysics and their interrelation.

Science News-Letter, October 5, 1929

SCIENCE AND THE UNSEEN WORLD—Arthur Stanley Eddington—*Macmillan* ($1.25). The distinguished astronomer and physicist of Cambridge University here further elaborates his views on the relation of science and religion as given in the last part of his "Nature of the Physical World." It is the text of his Swarthmore Lecture, delivered last spring in London before the Society of Friends, of which he is a prominent member.

Science News-Letter, October 5, 1929

THE STORY OF THE WEATHER—Euguene Van Cleef—*Century* ($2). An interesting book describing not only the various weather phenomena and their cause, but also telling how some of these things may be turned to good account by the alert business man.

Science News-Letter, October 5, 1929

INTRODUCTION TO QUANTITATIVE ANALYSIS—Edward G. Mahin—*McGraw-Hill* ($2.25). In this new volume in the publisher's International Chemical Series the author has abridged his very successful larger book on the subject, and produced a work that can be used in colleges giving a single year, or less, of quantitative analysis.

Science News-Letter, October 5, 1929

MYTHS AND TALES OF THE SOUTHEASTERN INDIANS—John R. Swanton—*U. S. Government Printing Office* ($1). A large collection of stories told by Indians of the Creek, Natchez, and other tribes. Dr. Swanton recorded most of the tales more than fifteen years ago, and even then there were not many Indians who knew the old tribal languages, so that they could relate the tales in the true Indian wording.

Science News-Letter, October 5, 1929

THE PSYCHOLOGY OF ABNORMAL PEOPLE—John J. B. Morgan—*Longmans, Green* ($3.75). A healthy state of mind is quite largely dependent on education, the author believes, and therefore educators and adults who deal with children should understand the more common weaknesses of the human mind and should be able to direct the children in their charge toward healthy attitudes and habits of thinking. Besides being based on a sound line of argument, the book is an exceptionally comprehensive and clearly written text on all sorts of emotional and mental disorders.

Science News-Letter, October 5, 1929

MASTER OF MY FATE—Herschel T. Manuel—*Century* ($3). A "popular" psychology in a desirable sense of the word, written by a professor of psychology at the University of Texas for young men and women who want to know how to make the most of themselves. The first part deals briefly with the biological and psychological foundations of human conduct. The second deals with the personality problems that people are continually asking psychologists to help them solve; problems dealing with social adjustments, physical traits, character, religion, and self improvement from every angle. The long list of 502 points on which readers can analyze themselves is a constructive feature of the book.

Science News-Letter, October 5, 1929

THE ART OF STRAIGHT THINKING Edwin Leavitt Clarke — *Appleton.* Are the things you know really so, or is your mind a dizzy confusion of propaganda, fallacies, half-baked ideas and prejudices? Aiming to help the reader avoid the latter alternative, this book explains in much logical detail the processes by which we acquire our knowledge and our views, particularly our views on the problems of the world today. It is a logic textbook, written particularly to set college students and other students to thinking clearly on social subjects. There are chapters, for example, on prejudice, dishonest propaganda, oral testimony, and a co-operative technique for solving social problems.

Science News-Letter, October 5, 1929

THE AGE OF THE HUMAN RACE IN THE LIGHT OF GEOLOGY—Stephen Richarz — *Cath. Anthropol. Conf.* (30c.). This pamphlet sums up the evidence for a high antiquity of the human race, invoking the positively known lapse of time as measured by varve clays and the probabilities involved in glacial advances and retreats. The minimum age allowed is 30,000 years, and the possibility of a much higher figure admitted. The author's final declaration, that "no theological problem is involved," will hardly accepted in Fundamentalist circles.

Science News-Letter, October 5, 1929

PRINCIPLES OF ANIMAL BIOLOGY—A. F. Shull—*McGraw-Hill* ($3.50). A third edition of a very successful textbook, revised to take in the newest advances in its field. The physiological approach to biology gives this book a strong appeal in modern teaching circles.

Science News-Letter, October 5, 1929

MODERN BIOLOGY—J. T. Cunningham—*Dutton* ($3). A critical examination of some of the still-vexed problems in biology that confront modern students. Many of the things we considered pretty well settled a decade or two ago are again open to discussion; and the present author's discussion will be found stimulating by many readers.

Science News-Letter, October 5, 1929

PLANT AND ANIMAL NEIGHBORS—F. B. Younger—*C. C. Nelson, Appleton, Wis.* A general biology reader for junior high school use.

Science News-Letter, October 5, 1929

STUDIES IN THE FLORA OF LOWER CALIFORNIA AND ADJACENT ISLANDS—Alice Eastwood—*Proc. Calif. Acad. Sci.* Of interest to students of systematic botany.

Science News-Letter, October 5, 1929

PALEONTOLOGY — E. W. Berry—*McGraw-Hill* ($3.50). A textbook of extinct animal forms, compact but complete, well-arranged and well-illustrated. Prof. Berry's book is deserving of adoption by university classes in paleontology, and should find a place on the reference shelf of any properly organized course in general geology.

Science News-Letter, October 5, 1929

Elaborate Burial in Indiana Mound

An Indian mound containing burials of a most elaborate type has just been opened up at Winchester, Indiana, by F. M. Setzler, operating under the auspices of the Indiana Historical Bureau and the Smithsonian Institution of Washington, D. C. The skeleton found beneath the earthwork must have belonged to a mighty chief, for the mound raised in his honor was 80 feet in diameter and eight feet high. It was surrounded by an earthwork enclosing 31 acres of land.

Near the center of the mound was a large area containing raw ochre and partly decomposed bark. In the center of this area was a pit, where offerings of material comfort for the spirit of the departed had evidently been made. There were numerous cremated bird bones, two ceremonial spear points, and two gorgets or throat ornaments, one of slate and the other of sandstone.

Three feet beneath the sacrificial pit in the bark and ochre layer lay the bones of the departed warrior, a man of middle age when he died. Along with the skeleton was an extra skull, badly crushed. Mr. Setzler conjectures that this was possibly added for some ceremonial reason. The bones rested on bark, and had apparently been bark-covered when interred. At the east end of the burial there were six post holes in the ground, indications possibly of a wooden structure since fallen into decay.

To the west of the burial is a stone wall, which has not yet been opened. Mr. Setzler believes that this may conceal more skeletons, which further digging will bring to light.

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The Universe Around Us

THE UNIVERSE AROUND US—Sir James Jeans—*Macmillan* ($4.50). This is an irresistible book; a book that will be ordered at first sight of its announcement by wide-awake librarians everywhere. There is no other book to compare with it except Eddington's "Nature of the Physical World" for giving to the general reader a comprehensible idea of the new conceptions of the cosmos developed within the last ten years. And these two books, Eddington and Jeans, are complementary rather than competitive, both being essential for a full view of the universe now revealed to our eyes.

We are in the midst of a revolution in fundamental principles as great as that brought about by Copernicus and Galileo three hundred years ago and bound to have as wide an influence over our ideas of theology, our theories of space and time and our opinion of man's position in the world and his future possibilities. At no period in human history have so many of our basal ideas required such rapid and radical reconstruction as in our own time. Astronomy and chemistry have joined forces. Space and time are becoming assimilated. The indestructible atom has been dissolved into a miniature solar system and this into an undefinable system of wave harmonics. One element has been transformed into another. We talk without hesitation about the continuous destruction and creation of matter. The human race has been given an expectation of life extending to a million million years in the future. Astronomers calculate temperatures of 5,800,000,000 degrees in the interior of stars and distances of 140,000,000 light years. According to Einstein a ray of light traveling in a straight line in any given direction would, unless interfered with, arrive at its starting point from the opposite side in 500,000 million years.

We could have no more authoritative a guide to the facts and speculations developed in recent years than Sir James Jeans, who has taken an active part in its progress. His book is as clear and comprehensive to the ordinary layman as any book can be which goes into the subject so thoroughly. Any difficulty of comprehension arises from the novelty of the ideas and the big figures involved. The author has eliminated all algebraic formulae from the text and only given us the final results of the mathematical processes by which the figures have been obtained. No one can read it or even read in it, without expanding his mind, although he may not be able to expand his imagination enough to comprehend the vastness of the new vision which science is now disclosing to us.—E. E. S.

Science News-Letter, October 5, 1929

NATURE RAMBLINGS

By FRANK THONE

Red Haws

Now that autumn is really here, boys who have not yet lost their rural birthright will find their mouths watering at the sight of a hawthorn tree loaded with its bright vermilion fruits, that look like miniature apples but have a mellow, musky flavor all their own. It is a taste that must be experienced and remembered, for it can not be described; and it is all the more tantalizing for being obtainable only in small nibbles, and at the risk of discovering at any moment a telltale bisected worm.

Why such toothsome little fruits as red haws should be so much sought after by worms is another riddle of a universe in which the good and the ill are much too closely intertwined for the comfort of simple minds. To be sure, a healthy boy gets around the matter by not regarding the worm as an ill, or at least as an insignificant ill when compared with the benefits of gnawing the wild fruit. But a reminiscent adult, attempting to find the fountain of youth in the heart of a haw and discovering only a maggot instead, is driven to philosophic pessimism.

Something ought to be done about the red haw. There are millions of men who will agree that it is one of the finest-flavored fruits that enriches our autumn woods, even though they may not have tasted one for forty years. But in spite of its high rating on the casual bill-of-fare of boys, it has never been given a real horticultural chance. Some years ago an exotic species, with fruit as big as small crabapples, was tried out in South Dakota, but the experimenter was interested in other fruits and did not push the red haw very hard. It really ought to be followed through.

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Among the varied uses to which airplanes are now put may be listed wolf hunting, sowing grass seed, and detecting city smoke violations

Jupiter Moves Backward in October

By James Stokley

The coming of October brings back to the evening sky the largest member of our family of planets, Jupiter. Saturn, the ringed planet, which was in the evening sky for the last few months, has now descended low in the west. It sets about three hours after the sun, and so is in a poor position.

Jupiter, however, has lately only been visible in the morning sky before sunrise, but now it appears in the east about eight o'clock in the evening. It is of the minus second magnitude, brighter than any stars in the neighborhood. From now on it will rise earlier and earlier every evening and will soon be a prominent feature of the winter evening sky.

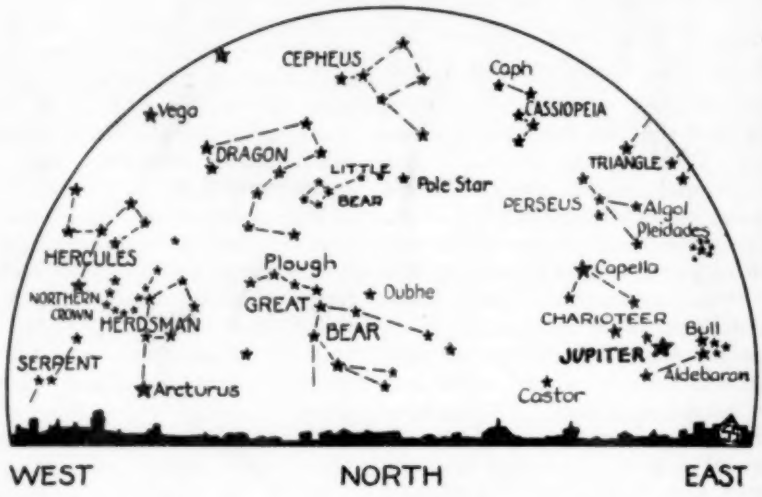
During this month a curious thing can be noticed about the motion of Jupiter. All of the planets revolve around the sun in an eastward direction. If you had watched Jupiter during the last month or two, plotting its place among the stars every night, you would have found that it was moving from west to east, as might be expected. But if you continue this plotting into October, you would find that its motion would become less and less. Then, about Oct. 5, it would seem to be stationary in the sky. After that time, it would seem to go backward and by the end of October it would appear to be moving from east to west.

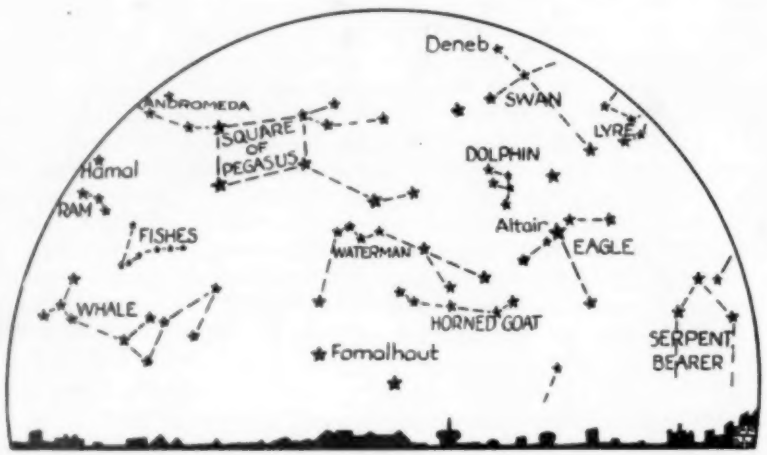
This strange behavior of Jupiter, which sometimes is shown by the other outer planets, Saturn, Uranus and Neptune as well, is called "retrograde motion". The effect is precisely similar to one that is often observed by travelers on a railroad train that passes another moving more slowly. If both trains are moving along a straight and smooth piece of track, and one cannot see any distant object, the more slowly moving train may appear to be actually running backwards to a passenger on the faster train.

The earth revolves in its orbit once in 365 days, while it takes nearly twelve years for Jupiter to travel once around the sun. The result is that when both Jupiter and the earth are on the same side of the sun, the earth travels past Jupiter and seems to leave it behind, thus causing it to retrograde among the stars.

This month, if you look to the south, you will see one of the most familiar of the celestial guide posts. This is the great square of Pegasus, seen this evening high in the southern sky. Four stars, of nearly equal brilliancy, mark the corners of the square. From the southeast corner extend a row of stars that form the head of the winged horse, while westward from the northwest corner extend other stars that form his forelegs. Strangely enough, the ancients who invented these constellation names placed Pegasus in the sky in an inverted position,—surely an undignified position for so impressive a creature! The northeastern star in the square does not really belong to the constellation of Pegasus, but to the neighboring one of Andromeda, the Chained Lady. She was represented in the old star maps as chained to a rock, where she had been placed by Jupiter to be devoured by a sea monster. Low in the southeast is the constellation of Cetus, the whale.

Among the other conspicuous constellations is Cygnus, the swan, with the bright star Deneb above. This constellation is also known as the northern cross, and is in an upright position in the western sky. To the northwest of Cygnus is Lyra, with the brilliant Vega, while to the southwest is Aquila, the eagle, containing Altair. Over in the northeast is another brilliant star, Capella, in the constellation of Auriga, the charioteer. Low in the east is the red Aldebaran in Taurus, the bull. These five stars and one other; Fomalhaut, in Piscis Austrinus, the southern fish, which is seen low in the south constitute the first magnitude stars visible this month.





HOLD THESE MAPS in front of you and face North or South. The upper or lower one will then show the stars of the October evening sky

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